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Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers	)))	CC Docket No. 01-338
	)	
Implementation of the Local Competition Provisions of the Telecommunications Act of 1996	)))	CC Docket No. 96-98
	)	
Deployment of Wireline Services Offering Advanced Telecommunications Capability	))	CC Docket No. 98-147

JOINT DECLARATION OF TOM STUMBAUGH AND DAVID REILLY ON BEHALF OF WORLDCOM, INC.

I. INTRODUCTION AND PURPOSE

1. My name is Tom Stumbaugh. I am employed by WorldCom as Senior Manager III - DSL Engineering, WorldCom OnNet DSL. My business address is 9100 East Mineral Circle, Englewood, CO 80112. My principal duties involve leading the engineering team responsible for researching and implementing DSL Access Technology for WorldCom's OnNet DSL Network. I have over nineteen years of engineering design and management experience in wireline telecommunications, chiefly in the data-communications and DSL areas. I began working for WorldCom in December of 2001. My qualifications and prior business experiences include:

• 12/01 to present:	Senior Manager III, DSL Engineering, WorldCom OnNet DSL.
• 10/97 - 12/01:	Director DSL Access Engineering, Rhythms NetConnections.
• 8/96 - 10/97:	Manager Systems Integration Engineering, Applied Innovation.
• 7/82 - 8/96:	Senior Network Engineer – CompuServe Incorporated.
• 1983:	Bachelor of Science in Computer and Information Science Engineering from the Ohio State University.

2. My name is David Reilly. I am employed by WorldCom as a Network Engineer. My business address is 9100 East Mineral Circle, Englewood, CO 80112. My duties include layer 1 design rules and loop qualification testing used by WorldCom for deploying DSL services in the U.S. I have fifteen years of engineering experience with broadband wireless, wireline, and coaxial communications systems. On December 4, 2001, I began working for WorldCom. My qualifications and prior business experiences include:

• 1999 – 2001:	Senior Network Engineer, Rhythms, Inc., Englewood, CO
• 1998:	Director of Technology, UltimateCom Wireless ISP, Denver, CO
• 1996 – 1998:	Senior System Engineer, Motorola Multimedia Cable Group, Englewood, CO
• 1993 – 1996:	Engineering Manager, California Microwave, Bloomingdale, IL
• 1990 – 1993:	System Engineer, TeleSciences Transmission Systems, Bloomingdale, IL
• 1988 – 1990:	System Engineer, Motorola Inc., Englewood, CO
• 1984 – 1988:	Communications Engineer, Western Area Power Administration, Huron, SD
• 1988:	BSEE, South Dakota School of Mines & Technology, Rapid City, SD

3. The purpose of this declaration is to explain the continuing need of WorldCom, Inc. ("WorldCom") to obtain UNE loops from incumbent LECs, regardless of whether the loop is composed of all-copper facilities, all-fiber facilities, or a combination of copper and fiber facilities, and regardless of whether the loop is provisioned using Digital Loop Carrier ("DLC") or other pair-gain equipment or carrier systems.

4. This declaration demonstrates that WorldCom will be precluded from providing competitive broadband services based on Digital Subscriber Line ("DSL") and other technologies to a substantial portion of the market if WorldCom is not given UNE access to *all* incumbent LEC legacy and current loop architectures and facilities, together with associated Operations Support Systems ("OSS"). WorldCom needs access to loops provisioned on DLC systems, on "next generation" DLC ("NGDLC") systems, on NGDLC systems equipped with Asynchronous Transfer Mode ("ATM") capabilities, and on broadband passive optical network ("BPON") systems, all of which have been or are being deployed by SBC, Verizon, BellSouth and Qwest ("BOCs").

5. This declaration also serves to supplement a joint declaration we submitted on October 12, 2000, known as the *DLC Declaration*, which has been incorporated into the record of this proceeding.[1] Our previous declaration was

[1] *In the Matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability and Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, Joint Declaration of Martin Garrity, David Reilly, Tom Stumbaugh and Rob Williams on Behalf of Rhythms NetConnections Inc. and Rhythms Links Inc., CC Docket Nos. 98-147 and 96-98, (dated Oct. 10, 2000)

submitted while we were employed by Rhythms; after WorldCom's acquisition of Rhythms' assets, we now work for WorldCom.

6. This declaration begins with a brief discussion of the history, current status, and future direction of the loop architectures, facilities and equipment commonly deployed by incumbent LECs, particularly the BOCs. This discussion focuses on the role of DLC systems, chiefly NGDLC systems, in the continuing evolution of the loop plant. We then address the ability of NGDLC systems to support loops with higher throughput capacity, focusing on DSL technology as one way to achieve higher capacity loops. Next, we discuss which loop and subloop features and functions WorldCom needs access to as UNEs. Finally, we demonstrate that WorldCom has no practical way to offer competitive DSL-based and other broadband services to end users and ISPs served by fiber-fed NGDLC loop architectures without access to such architecture as UNEs.

II. INCUMBENT LEC LOOP ARCHITECTURE: PAST, PRESENT AND FUTURE

7. The basic purpose of loops and the loop network is the same as it was when they were introduced 100 years ago: to connect end-user premises to a switching and/or routing point with physical facilities that allow end users to send and receive information. For decades, the loop plant consisted of all-copper pairs that ran from the end user premises to the serving central office ("CO") on a one-for-one basis (*i.e.*, one pair serving one end user premises). Generally, analog voice service carried

("DLC Declaration") (attached to comments of Rhythms NetConnections Inc., dated Oct. 12, 2000).

on all-copper loops longer than 18,000 feet suffers from significant signal degradation.[2] Nevertheless, by adding load coils, voice service could be extended to 24,000 feet. Beyond this distance on all-copper loops, however, additional electronics are required for adequate voice service. Resistance increases with circuit length, and in analog loop systems over 24,000 feet, these additional electronics are required to overcome the attenuation in the volume of the voice and terminal signaling in the loop network.

8. Eventually, incumbent LECs began deploying pair gain, or loop carrier, systems in the loop plant. These loop carrier systems "gained" pairs by multiplexing the voice-grade signals from a number of end users, and then carrying the multiplexed signal on fewer feeder pairs. An early example of this architecture upgrade was analog T-carrier systems, which carried 24 voice-grade signals on 2 pairs of copper feeder cables. Carriers have been deploying loop carrier systems since the 1970s.[3]

9. Digital Loop Carrier systems were the next step in the evolution of the loop network architecture and equipment. The DLC loop architecture consists of a Remote Terminal ("RT") in which the DLC equipment is housed, copper twisted pairs that extend from the RT to customer premises (normally routed through a cross-connect field known as a feeder-distribution interface ("FDI"), also known as a

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[2] *See, e.g.*, *Digital Loop Carrier Tutorial*, Telco Systems, available at <http://www.telco.com/products_solutions/WhitePapers/digital/page1.html>.

[3] *See, e.g.*, *Remote Deployed DSL: Advantages, Challenges, and Solutions*, Network Reliability and Interoperability Council Focus Group 3 (NRIC FG3) (Nov. 25, 2001) at 8 (lines 128-129) ("*NRIC FG3 Report*").

serving area interface ("SAI")), multiplexed pair gain copper or fiber facilities between the RT and the CO, and a Central Office Terminal ("COT") to which the copper or fiber feeder facilities from the RT are connected. The copper feeder facilities between the RT and the CO may include repeaters, and can thus travel a greater distance than normal copper twisted pairs before suffering unacceptable degradation.[4] The diagrams below contrast the traditional one-for-one all-copper loop architecture (figure 1) with the DLC architecture (figure 2).

[4] When fiber feeder facilities are used in the DLC loop architecture, the fiber is generally short enough not to require signal regeneration.

Figure 1: Traditional CO Architecture

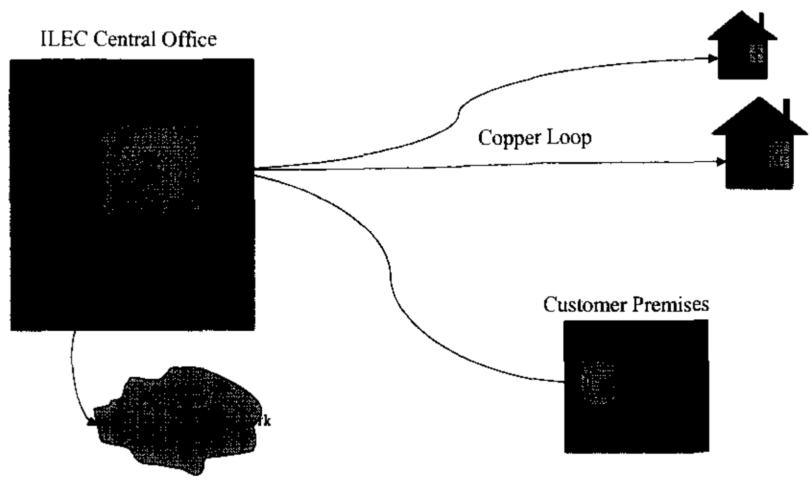
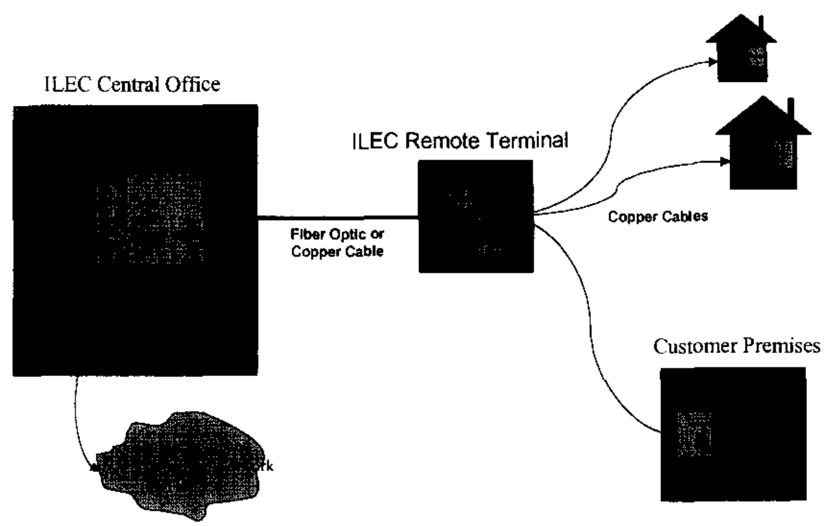


Figure 2: Legacy DLC Architecture



10. DLC was originally used for feeder pair relief in urban areas where increased demand exhausted the installed feeder pairs from the CO. DLC also served to combat service quality degradation associated with extended distances traversed by

all-copper loops. DLC extended the maximum loop serving length by moving the voice frequency interface closer to the customer. In addition, DLC also allowed the transmissions of numerous distant subscribers to be aggregated at the RT and transported back to the CO over relatively few feeder facilities. Moreover, DLCs reduced the amount of copper cable required for a given subscriber base, which helped to get around copper cable supply shortages and route congestion. Thus, DLC systems have made it possible for ILECs to economically serve subscribers that would otherwise be very expensive to serve.

11. Like DLCs, NGDLC systems have been in use by incumbent LECs for some time. As initially deployed in the 1980s, NGDLC systems used the DLC loop architecture discussed above. The original distinguishing characteristic of NGDLC systems was that they employed the GR-303 digital switch interface. GR-303 enhances DLC operations by increasing the number of lines per RT. It also allows for flexible concentration and remote network management, which is accomplished with an Embedded Operations Channel ("EOC").[5] NGDLC systems employ time division multiplexing ("TDM"), allowing many circuit-switched and private line analog and digital services to be carried on a single fiber system. As initially deployed, NGDLC systems included only limited ability to support higher capacity services: T-1 service and ISDN/IDSL were supported, but not other, high-bandwidth DSL types such as ADSL.

[5] *See, e.g.*, *The Evolution of Digital Loop Carriers*, White Paper, Occam Networks at 4 (May, 2001), available at < http://www.occamnetworks.com/pdf/DLCEvolution3-01.pdf>.

12. More recently, NGDLC systems have been upgraded to support high bandwidth DSL (*e.g.*, ADSL). Adding DSLAM functionality to RT-based NGDLC systems brings the DSL source signal closer to the subscriber, thus improving the quality of service because the length of the copper loop has been shortened.

13. Different vendors are using different approaches to supporting DSL-based traffic over the NGDLC architecture, but Alcatel's system provides a good example for discussion purposes.[6] The Alcatel NGDLC system is known as the Litespan 2000/2012. Until approximately three years ago, the Litespan NGDLC contained only lower bandwidth capabilities, and supported only the traditional circuit-switched services discussed above. Today, the enhanced Litespan platform supports ATM-based traffic, and specifically supports additional types of DSL, including ADSL, HDSL-2, and G.shdsl. These enhancements apply not only to newly deployed Litespan equipment, but also to legacy Litespan 2000 and 2012 NGDLCs already deployed in the field by the RBOCs. The chief difference between "old" and "new" Litespan 2000 and 2012 NGDLC is: 1) a system software upgrade to Release 10.x or above;[7] 2) the replacement of the Litespan Bank Control Units with ATM Bank Control Units ("ABCUs"); and 3) the use of new NGDLC line cards specific to each type of DSL.[8] As configured by at least one BOC – SBC – this DSL-

[6] We note that not all BOC "NGDLC" architectures may be the same. We thus use the term "NGDLC" broadly throughout this declaration to refer to NGDLC and NGDLC-like facilities involving some form of fiber-fed RT deployed to support both voice and data services.

[7] The current software release is Release 11, with Release 12 currently under development.

[8] For example, Alcatel calls its NGDLC line card that supports ADSL an ADLU card.

capable Litespan NGDLC system is configured with a separate fiber feeder system between the RT and the CO to carry ATM-based traffic. This separate fiber system is connected in the central office to an ATM switch.[9] This ATM switch serves as a router, allowing CLECs to obtain their DSL traffic from the overall ATM packet stream. Circuit switched traffic continues to be handled by the TDM side of the Litespan NGDLC system, and is routed to the existing COT.

14. In the DSL-capable NGDLC architecture, the DSLAM functionality is located on the line card in the NGDLC equipment at the RT. The DSLAM function is located in the NGDLC equipment because the DSLAM function must occur at the end of the copper facility, and copper pairs from customer premises terminate at the RT on the line card slots where the ADLU and other types of line cards are inserted. In the diagrams below, conventional CO-based DSL (figure 3) is compared to DSL over a generic NGDLC (figure 4).

[9] SBC and Verizon call this ATM switch an optical concentration device, or "OCD."

Figure 3: CO-Based DSL Architecture

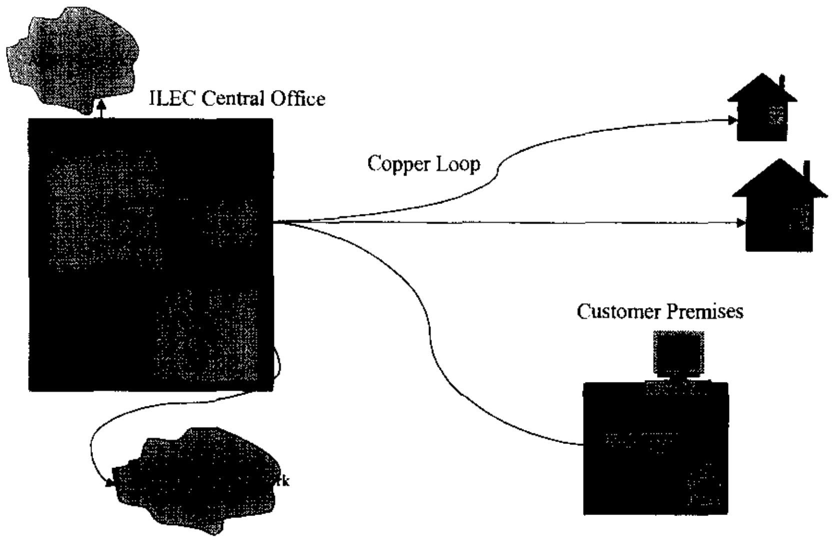
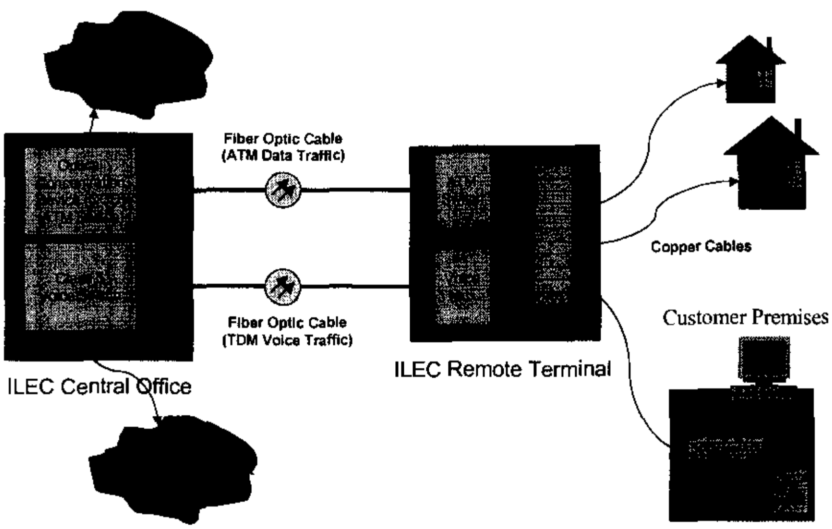


Figure 4: NGDLC DSL Architecture



15. It is also possible to support DSL-based services in an NGDLC architecture using separate DSLAMs located in or next to the RT enclosures that contain DLC and NGDLC equipment. This architecture, of course, would only be used if the NGDLC equipment is not or cannot be made DSL-capable, as discussed above. These separate DSLAMs perform the same function as do central office-based DSLAMs. In such a configuration, the signal from the DSLAM would need to be transported to the CO on incumbent LEC fiber-feeder facilities, via the use of a SONET add-drop multiplexer, and handed off to each carrier at the CO. As we discuss below, however, CLEC installation of separate DSLAMs in or next to RTs is generally not a practical alternative to unbundled NGDLC access because it is prohibitively expensive when compared to the number of potential subscribers that a CLEC could serve from an RT.

16. It is worth noting that, technologically speaking, little has changed in the NGDLC arena since we filed the *DLC Declaration* a year and a half ago. What has changed, however, is the scale and pace at which the BOCs are deploying NGDLC platforms.[10] Indeed, the percentage of local loop subscribers served by DLC and NGDLC systems represents a significant fraction of the local market. Approximately 35% of all fixed access lines in the U.S. are currently served by DLC and NGDLC systems, and this percentage is expected only to increase in the

[10] Unfortunately, notwithstanding the rapid pace of NGDLC deployment by the BOCs, the Commission has yet to expressly rule on how competitors can access DSL-capable loops provisioned on the fiber-fed NGDLC architecture.

future.[11] In Verizon's territory, for example, close to 38% of all access lines are supported through DLCs and, in BellSouth's territory, nearly 44% of the total access lines traverse DLC platforms.[12] The national average is projected to be as high as 50% by 2004.[13] SBC has announced a rapid rollout schedule for its NGDLC platform, "Project Pronto." This $6 billion initiative is expected to "dramatically reduce its network cost structure. Expense and capital savings alone will offset the cost of the entire initiative."[14] For example, in its California territory, SBC plans on replacing current systems with NGDLC systems in approximately 300 of its 750 central offices within three to four years.[15] Thus, within only four years, at least 40% of the central offices in SBC's territory in California will be NGDLC equipped. NGDLC is fast becoming the loop serving technology of choice.

17. Verizon has also indicated that it intends a widespread rollout of DSL capable fiber-fed NGDLC equipment in an architecture essentially identical to that

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[11] *See DSL Anywhere*, DSL Forum ("a consortium of more than 330 leading industry telecommunications, equipment, computing, networking and service provider companies, including incumbent and competitive carriers"), at 7 (December 12, 2001) (citing RHK 2000 Access Network System Market Forecast, February 29, 2000). Report available at <http://www.ntia.doc.gov/ntiahome/broadband/comments/dslf/dsl_anywhere.pdf> ("*DSL Anywhere*").

[12] *See Optical Access: North America, Service Provider Analysis: BellSouth, Qwest, SBC, and Verizon – Deployment and Trends for DLC and PON*, RHK Telecommunications Industry Analysis (Dec. 2001) at 5, 20 ("*Deployment and Trends for DLC and PON*").

[13] *See DSL Anywhere* at 7.

[14] *See SBC Launches $6 Billion Initiative To Transform It Into America's Largest Single Broadband Provider*, News Release, SBC Communications, Inc. at 1 (Oct. 18, 1999), available at < http://webcast.sbc.com/media/news/release.doc>.

[15] *See Evidentiary Hearing in the Permanent Line-Sharing Phase of OANAD*, California Public Utilities Commission (July 30, 2001), Tr. at 12854.

of SBC's Project Pronto.[16] Verizon has also indicated its intention to offer CLECs a wholesale service Verizon calls "PARTS" (for "Packet At the Remote Terminal Service"). In a February 2001 presentation located on Verizon's Website, Verizon "estimates approximately 1,500 PARTS eligible RTs may be deployed throughout VZ over the next two years."[17]

18. In sum, DSL-capable NGDLC systems offer two significant advantages for DSL service providers: 1) As described above, they allow an increased number of subscribers to receive DSL service (by extending the distance a subscriber can be located from the CO, thus affording even distant subscribers DSL access); and 2) they allow for improved service, in the form of higher data rates (by moving the DSLAM closer to the subscriber). These are the key motivators for the BOCs' mass deployment of DSL-capable NGDLC systems. Indeed, as the Public Service Commission of Wisconsin recently recognized:

> Ameritech initiated its Project Pronto network initiative specifically to overcome limitations inherent in the ability of copper loops to support advanced services to the majority of its customer base.... Project Pronto will extend the market reach of DSL. Ameritech will be able to provide DSL service to an additional 20 million customers

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[16] *See Planned Verizon Next Generation Digital Loop Carrier (NGDLC) Remote Terminals (RT)*, Verizon Communications, Inc., available at <http://128.11.40.241/east/wholesale/resources/planned_next_gen_dig_loop_carrier.htm.

[17] *See Verizon PARTS Workshop, Packet at Remote Terminal Service*, Verizon Communications, Inc. (Feb. 6, 2001), available at <http://128.11.40.241/east/wholesale/resources/ppt/0206workshop.ppt>. We note that Verizon recently announced a more limited roll out during 2002 of its DSL-capable fiber-fed NGDLC platform. However, Verizon has not withdrawn its announced plans to deploy its DSL-capable NGDLC platform on a broad basis.

> throughout the 13-state SBC territory that it cannot serve without Project Pronto.[18]

III. WORLDCOM NEEDS ACCESS TO THE NGDLC LOOP, AND SUBLOOP AND PACKET TRANSPORT

19. As we explained in the *DLC Declaration,* in order to serve customers whose loop has been migrated to fiber, WorldCom needs access to the end-to-end loop and associated electronics.[19] Specifically, WorldCom cannot provide DSL–based services to any end user served with a fiber-fed NGDLC loop without access to the end-to-end NGDLC loop and the copper cable subloop that travels from the customer's premises to the RT.[20]

20. As NGDLC platforms become increasingly prevalent in the incumbent LECs' networks, CLECs' CO-based infrastructure, deployed in the past 3 – 4 years, will become less and less useful. As discussed above, CO-based DSLAMs cannot be utilized over fiber-fed loops. As a result, if an incumbent LEC elects to install an NGDLC system and removes existing copper from the CO, the CLEC's CO-based DSLAM will be of no use.

21. Even if the incumbent LEC leaves some of the existing copper loops in place, CLECs will be unable to compete effectively. First, the incumbent LECs will be able to serve more customers than CLECs because they will have access to both the fiber-fed and copper loops, while CLECs will be left to serve only those

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[18] *Investigation Into Ameritech Wisconsin's Unbundled Network Elements*, Public Service Commission of Wisconsin, Docket 6720-TI-161, Final Decision at 10 (March 22, 2002) ("*Wisconsin Decision*").

[19] *DLC Declaration*, para. 81.

[20] *Id.*, paras. 90-92.

customers they can reach using copper loops from the CO. Second, because the RT-based DSLAMs are closer to the customer, the incumbent LECs will be able to offer more attractive service offerings with higher data rates.

22. Third, even if the existing copper is maintained, CLECs may not be able to use it because of interference issues. The incumbent LECs' DSL service may interfere with CLEC DSL service provided on all-copper loops, because RT-based ADSL services overpower the weaker home run copper ADSL loops that share the same distribution facilities. For example, if WorldCom is providing ADSL to an end user that is 15 kilofeet away, and the incumbent LEC is providing RT-based ADSL to an end user that is only 12 kilofeet away, the potential for harmful interference is significant. The incumbent LEC signal is much stronger and will overpower the CLEC's weaker signal. If a CLEC is forced to provide service solely over home run copper, and an incumbent LEC places DSLAM functionality in the same RT that serves the CLEC's end user, the transmission of the incumbent LEC's RT-based ADSL signals will effectively prevent the CLEC's signal from being usable at its destination.[21] The interference between RT-based ADSL transceivers and home run ADSL loops was the subject of a white paper that WorldCom and others submitted to the FCC's Network Reliability and Interoperability Council (NRIC V).[22] In the white paper, WorldCom and others outlined this issue and urged the Commission to take action to adopt rules that would mitigate this problem.

[21] *See DLC Declaration*, paras. 120-127.

[22] *See NRIC FG3 Report.*

IV. CLECS NEED UNE ACCESS SO THAT THEY CAN DIFFERENTIATE THEIR SERVICE OFFERINGS

23. CLECs need UNE access to the NGDLC platform so that they can: 1) provide service to customers served by fiber-fed loops; and 2) offer different varieties of xDSL service and different service levels. Like CO-based DSL service, UNE access to NGDLC loops will allow for diverse CLEC service offerings. If WorldCom is denied UNE access and is permitted only to purchase ILEC-provided services, we will be unable to offer the types of products we currently sell to businesses and ISPs.

24. Mover, with different, industry-standard Quality of Service ("QoS") classes, CLECs could provide consumers with throughput-sensitive applications like video and voice over DSL or IP. When the incumbent LEC sells a DSL service to residential areas from their DLC based DSLAM, they use an Unspecified Bit Rate ("UBR") QoS class and every customer gets the same level of service. A CLEC like WorldCom may decide to sell a variety of DSL-based services to the same set of customers. Examples include small office or home office broadband services, where the customer gets better service level agreements and more guarantees on data throughput rates; voice over DSL, where the voice encapsulated data gets prioritized over lower priority data traffic; or premium Internet service for server-based home businesses (*e.g.*, Mary Kay). In these cases, the CLEC must have access to different ATM QoS classes in order to support different types of services. ATM technology, used in the data segment of the NGDLC platform, carries traffic on virtual transmission paths, known as Virtual Circuits ("VCs"), Permanent Virtual Circuits ("PVCs"), Permanent Virtual Paths ("PVPs"), and Switched Virtual Circuits

("SVCs"). There are industry-standard ATM QoS classes applicable to PVCs and PVPs, which support different services with different latency (delay) requirements. If the incumbent LEC only allows the UBR QoS class, whether as a service or as a UNE, the CLEC's ability to sell differentiated products will be severely constrained. The incumbent LECs must allow CLECs access to all of the QoS classes that are technically feasible with NGDLC platforms. As we discussed in the *DLC Declaration*,[23] CLECs must have the option of guaranteed bit-rates on the DSL-capable NGDLC platform. This capability will protect DSL customers against incumbent LECs oversubscribing the fiber and will also allow for bit-rate sensitive applications like video.

25. If a QoS class requires additional bandwidth, that can be factored into the pricing of the loop with that QoS class feature. BOCs want to limit QoS to UBR service or, at best, constant bit rate ("CBR") service at a maximum of 96 kilobytes per second per PVC. This will significantly limit CLEC service offerings. UBR service is a "best efforts" class of service, with no guarantee of quality (*i.e.*, speed or throughput). Industry-wide forums have defined additional QoS classes, including higher bandwidth CBR, Available Bit Rate ("ABR"), and Variable Bit Rate ("VBR"). NGDLC vendors are working to add these additional ATM QoS classes to their platforms. These industry-standard QoS classes will allow CLECs to offer more diverse offerings, such as bit-rate sensitive applications like video and voice over IP.

[23] *DLC Declaration*, paras. 94-95.

V. NO ALTERNATIVES EXIST FOR CLECS TO ACCESS FIBER-FED LOOPS AND SERVE END-USERS WITH DSL

Collocation at the RT is No Alternative to Unbundled Access

26. As we explained in the *DLC Declaration*, unlike Central Offices, Remote Terminals usually lack adequate space to allow for collocation of traditional DSLAMs.[24] While WorldCom wants to maintain the option to collocate traditional DSLAMs at the RT, this option will not likely be the most efficient or the most effective way to provision DSL over fiber-fed loops, and may not even be routinely available. Additionally, because RTs serve far fewer subscribers than COs, the cost of the DSLAM per subscriber is considerably higher than the case where the DSLAM is located in the CO. This fact alone renders remote collocation uneconomical.

27. The incumbent LEC answer to the RT space problem -- that CLECs install DSLAMs in their own adjacent RTs -- is economically unfeasible and, under this configuration, the means to connect the DSLAM to the unbundled fiber feeder network element may not be technically feasible, let alone commercially viable. As we discussed in the *DLC Declaration*,[25] rights-of-way issues and land-use restrictions also pose substantial obstacles to adjacent collocation. Incumbent LECs often install remote terminal equipment on privately owned premises where land-use restrictions arise from rights-of-way, easement and zoning requirements. Before a CLEC can place equipment in an adjacent collocation arrangement, agreements must be secured with the land owner and permits must be obtained from local municipalities. Unlike

[24] *Id.*, paras 64-66.

[25] *Id.*, paras. 68-69.

incumbent LECs, which have historical ease of access based on their monopoly status, CLECs may not be able to gain authorization and permits from local municipalities and private landowners to build adjacent RTs. Imposing these requirements on CLECs will place an unacceptable burden on competition.[26]

28. Exacerbating the RT collocation problem is the fact that the BOCs are designing and deploying NGDLC RTs to fit only their own equipment, purposely overlooking CLEC collocation needs. For example, in the design of its Project Pronto, SBC unnecessarily elected to: 1) hard wire the copper feeder pairs to its NGDLC equipment; and 2) deploy RT cabinet enclosures sized to fit only the NGDLC equipment, with no spare space for other equipment, thereby precluding collocation at the RTs. This reflects either poor engineering judgment or another attempt at suppressing competition. In any event, largely because of BOC design, the cost for CLECs to collocate conventional DSLAMs at RTs has been found to be between $15,000 and $30,000, or even higher, as discussed below. CLECs simply cannot compete on a large-scale basis if they have to incur costs of this magnitude.

29. Arbitrators in the Texas Project Pronto Line Sharing Proceeding recently awarded CLEC access to the loop as an end-to-end UNE in the NGDLC platform. In their decision, the arbitrators provided an informative discussion regarding SBC/SWBT's design of the RT and the problems associated with DSLAM collocation:

> [B]ecause of the way SWBT has designed Project Pronto, CLECs are in essence denied the ability to collocate DSLAMs at SWBT remote terminal (RT) sites. SWBT

[26] *Id.*

> indicated that it has made voluntary commitments as a solution to this problem by increasing the size of RTs and providing adjacent cabinet structures. However, because SWBT chose to hard wire the RT, a CLEC may have to pay between $15,000 and $30,000 per remote terminal for access to the subloop. Uncontroverted evidence in this record indicates that SWBT designed the RTs in such a manner as to preclude any reasonable CLEC access to sub-loops at the RT even though vendors manufacture RTs with cross-connect functions that allow access to subloops. The simple fact that SWBT has hardwired its equipment at the RT and CLECs will be forced to pay for a work-around or to build adjacent collocation space supports a finding that SWBT cannot meet its burden to be relieved of its unbundling obligation. In sum, the evidence presented to the Arbitrators indicates that collocating a DSLAM at the remote terminal will in most cases not only prove to be uneconomical, but also technically problematic."[27]

30. SBC's unilateral decision to hard wire the remote terminals dramatically skewed the playing field, causing a substantial lack of parity between SBC's data affiliate ("ASI") and CLECs that wished to collocate at remote terminals. As the Texas Arbitration Award recognized, collocating CLECs would have to pay between $15,000 and $30,000 per remote terminal for access to the subloops (setting aside other collocation costs). For example, if one assumes that a CLEC must collocate in 20 RTs for a particular CO, and you assume an average cost of $22,500 for RT collocation (the average of $15,000 and $30,000), WorldCom would need to spend an additional $450,000 in unnecessary collocation costs *for this one CO*. ASI,

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[27] *Petition of Rhythms Links, Inc. against Southwestern Bell Telephone Company for post-interconnection dispute resolution and arbitration under the telecommunications act of 1996 regarding rates, terms, conditions and related arrangements for line sharing*, Public Utility Commission of Texas, Docket No. 22469, Revised Arbitration Award at 66 (citations omitted) ("*Texas Arbitration Award*").

on the other hand, can access DSL-capable loops through Project Pronto at zero incremental cost.

31. Moreover, in the Illinois Project Pronto line sharing proceeding, Sprint indicated that the cost of collocating DSLAMs at the remote terminals was dramatically more expensive.[28] For example, Sprint presented evidence that it spent at least $130,000 and several months attempting to collocate just one DSLAM at a remote terminal in Kansas.[29] As the Illinois Commission recognized: "[u]sing the number of RTs in Illinois, Sprint alone would have to spend an estimated $260 million to obtain access to the same loop architecture which SBC/Ameritech can access."[30] CLEC collocation of DSLAMs at the RT is clearly no solution.

32. As discussed above, Verizon's NGDLC platform is expected to look much like SBC's Project Pronto. Consequently, WorldCom anticipates many of the same obstacles presented by remote terminal collocation with SBC. Indeed, the New York Public Service Commission has ruled on the issue of collocation at Verizon's RTs, and also found that it is uneconomical for CLECs to do so: "[the record] shows that collocation by competitors on the terms offered by Verizon's tariff at these remote terminals is under many circumstances prohibitively costly and slow, and unlikely to be commercially viable."[31]

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[28] *See Illinois Bell Telephone Company Proposed implementation of High Frequency Portion of Loop (HFPL)/Line Sharing Service*, 00-0393, Illinois Commerce Commission, Order On Rehearing at 24 (Sept. 26, 2001) ("*Illinois Order on Rehearing*").

[29] *Id.*

[30] *Id.*

[31] *Proceeding on Motion of the Commission to Examine Issues Concerning the Provision of Digital Subscriber Line Services*, State of New York Public Service Commission,

Use of Existing Copper Loops is No Alternative to Unbundled Access

33. Incumbent LECs suggest that, as an alternative to unbundled access, CLECs simply use existing all-copper loops that run parallel to fiber-feeder NGDLC loops to the customer's premises. This suggestion is based on the fact that, when an incumbent LEC installs a DLC system, in addition to installing fiber from the CO to the RT, it leaves some of the old copper loops in the ground and runs them through the RT to the original customer. As we discussed in the *DLC Declaration*,[32] and Section III above, this "solution" is unworkable for two reasons. First, as discussed above, the potential for interference from the incumbent LEC's RT-based service is far too great. The CLEC-transmitted copper cable signal would be significantly attenuated by the time it reached the distribution cable, where it would be joined by a very strong signal generated by the incumbent LEC's RT-based service. Because of the difference in magnitude, the incumbent LEC signal would drown-out the CLEC signal.[33]

34. Second, as a practical matter, the "existing copper loop" may no longer exist (or, at a minimum, will no longer be in one piece). Once fiber is installed, the typical incumbent LEC practice is to re-use the existing copper in the feeder side of the RT to serve customers between the CO and the RT. As a result, the "old" copper loop will no longer exist in most cases. The distribution portion (1/2 of

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Opinion No. 00-12, Case 00-C-0127, Opinion and Order Concerning Verizon's Wholesale Provision of DSL capabilities at 25 (issued Oct. 31, 2000) ("*New York Order*").

[32] *DLC Declaration*, paras. 120-127.

[33] *DLC Declaration*, paras. 120-127.

the copper loop) of the loop now connects the RT to the customer. The RT is, in turn, connected to the CO by fiber. The copper feeder portion of the loop is recycled to another customer closer to the CO. Thus, the copper loop no longer exists but the copper is still in the ground. Because of this reality, BOCs can commit to leaving copper in the ground, while simultaneously refusing to provide CLECs with a copper loop.[34] As the Public Service Commission of Wisconsin recognized in awarding unbundled access to SBC's Project Pronto, "Ameritech will have an incentive to retire or simply not maintain the copper plant because it is inefficient to maintain two loop networks simultaneously."[35]

VI. INCUMBENT LECS SHOULD BE REQUIRED TO PROVIDE CLECS WITH UNE ACCESS TO THE NGDLC LOOP PLATFORM

35. In sum, it is technically feasible to unbundle NGDLC platforms such as Project Pronto and Verizon's NGDLC system. As was the case in the *Line Sharing Proceeding*, the Commission should require incumbent LECs to do so immediately, and to make any required OSS modifications to support such unbundling within six months.

[34] *DLC Declaration*, para. 127.

[35] *Wisconsin Decision* at 10.

Declaration

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 2, 2002.

Tom Stumbaugh

Declaration

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 2, 2002.

David Reilly

David Reilly

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Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers	)	CC Docket No. 01-338
	)	
Implementation of the Local Competition Provisions of the Telecommunications Act of 1996	)	CC Docket No. 96-98
	)	
Deployment of Wireline Services Offering Advanced Telecommunications Capability	)	CC Docket No. 98-147

DECLARATION OF BERNARD KU
ON BEHALF OF WORLDCOM, INC.

Based on my personal knowledge and on information learned in the course of my duties, I, Bernard Ku, declare as follows:

1. My name is Bernard Ku. In my current position as a Senior Manager of WorldCom, Inc. (WorldCom), I have responsibility over the Intelligent Network, Signaling, Switching Standards and Patent Engineering Group. I also serve as a delegate to the ITU-T Study Group 11 (IN/IP requirements), Study Group 16 (Multimedia Systems, Services and Terminals), Study Group 13 (IP based Networks and Interworking), and also the U.S. Standards Committee T1S1. I received a Bachelor of Science degree from the University of Hong Kong, a Masters in Business Administration from the University of Texas, a Masters degree in Computer Science from the University of North Texas, and a Ph.D. from Southern Methodist University (SMU). Since 1994, I

have served as an Adjunct Professor in the Electrical Engineering and Telecommunications Systems Department at SMU.

2. In WorldCom's pleadings in the *UNE Remand* proceeding, I attested in a declaration and reply declaration that CLECs must have access to call-related databases and signaling networks provided by ILECs. The purpose of this declaration is to explain that market or other conditions have not changed in a way that would warrant any modification to my conclusions in my earlier *UNE Remand* declarations.

3. As I explained in my earlier declarations, signaling networks are essential. Signaling networks transmit routing messages between switches and between switches and call-related databases. These databases include, for example, the LIDB database, the LNP database, the 800 database, the 911 database, the CNAM database, and AIN databases.

4. CLECs using an ILEC's switch to provide service have no option but to obtain signaling from the ILEC. When a CLEC purchases ILEC switching, a CLEC's need for ILEC signaling is absolute. This is because an ILEC's switch cannot transmit signals on calls from ILEC customers through the ILEC's signaling network and calls from CLEC customers through the CLEC's signaling network. The existing SS7 protocol does not allow the database to which a query is sent to vary depending upon who originated the call. Moreover, the ILEC's switch is only connected to its own signal transfer point (STP).

5. Where CLECs use their own switches, it also continues to be imperative that CLECs be able to obtain access to an ILEC's signaling networks, as I explained in my previous declarations. This is particularly so for smaller CLECs. As the Commission

found in the *UNE Remand Order*, signaling networks provided by third-party providers are not as ubiquitous as those of the ILECs, forcing CLECs using such networks to route signals to distant STPs. This is because no third-party vendor owns a signaling network in every LATA or provides direct connectivity with the ILECs' switches. Moreover, third-party signaling networks lack the redundancy that protects against outages.

6. In contrast to most CLECs, WorldCom has its own signaling network that it uses as an interexchange carrier. It can utilize this network for local service when it is providing service using its own switches. But even when a CLEC is using its own signaling network, the CLEC must still be able to access the ILEC's signaling network. Only by transmitting signals through the ILEC's signaling network can the CLEC obtain information needed to route calls – such as whether a particular ILEC switch is congested and should be avoided. In addition, only by transmitting signals through the ILEC's signaling network can the CLEC access information in the ILEC's call-related databases, since these databases are connected only to the ILEC's STPs.

7. With respect to call-related databases themselves, it continues to be competitively necessary for CLECs to use the ILEC's call-related databases. When CLECs are using unbundled switching, there is no way for them to connect to their own databases. As noted above, the ILEC switch cannot direct signals to the CLECs' databases for CLEC customers and to the ILEC's databases for other customers.

8. Moreover, even when CLECs are using their own switches, CLECs often cannot create call-related databases of comparable quality to those of the ILECs, and thus need access to ILEC databases. Much of the information contained in ILEC databases is not independently replicable by a CLEC or third-party vendor. LIDB contains line and

billing information for all lines of ILEC customers, for example, as well as information on all CLEC UNE-P or resale customers. This information is updated constantly. Thus, when CLEC customers attempt to call ILEC customers, who still constitute the vast majority of customers, a CLEC has no way of determining whether the ILEC customer will accept collect calls, for example, without access to the ILEC's LIDB information. A CLEC or third-party vendor cannot develop its own LIDB without access to the ILEC's LIDB – and even then would need the information from the ILEC to be updated many times each day.

9. Additionally, it would require a significant investment for a CLEC to deploy a redundant network architecture, and new entrants generally lack economies of scale sufficient to justify such an investment. As a result, most have not made such an investment. Some larger CLECs have created their own call-related databases for particular functions – where they have access the information needed to populate their own databases and they have sufficient economies of scale to justify the investment. WorldCom has, for example, developed its own LNP database. WorldCom has access to all of the ILEC LNP information through third party administrators of LNP data. WorldCom also has substantial economies of scale with respect to LNP since WorldCom needs the LNP information as an IXC, as well as a CLEC. But this is a rare combination of circumstances even for a large CLEC such as WorldCom. Requiring CLECs to develop call-related databases would constitute a significant barrier to entry.

10. In any event, even if it made economic sense for some CLECs to deploy additional databases and they had the information to do so, it would still take time to deploy such databases. They would need per-query access to ILEC databases in the

interim or they would be unable to offer the important services that rely on such databases. For databases such as LIDB, such issues are hypothetical as no ILEC has made available the batch downloads of database information a CLEC would need to create its own databases.

11. This concludes my declaration on behalf of WorldCom.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 2, 2002.

Bernard Ku